



TECHNOLOGICAL EDUCATION INSTITUTE OF
CENTRAL MACEDONIA
SCHOOL OF TECHNOLOGICAL APPLICATIONS
DEPARTMENT OF MECHANICAL ENGINEERING

Graduate Studies Program:
Academic Year 2015 - 16

**"Renewable Energy Systems: Design,
Development and Optimization"**

Supervisor's Name: Dr. Dimitrios Kalpaktsolgo

Subject:

Comparison of Fuel Cell Technologies

Introduction & Motivation:

A fuel cell uses the chemical energy of hydrogen or another fuel to cleanly and efficiently produce electricity. Fuel cells can be used in a wide range of applications, including transportation, material handling, stationary, portable, and emergency backup power applications. The aim is to categorize fuel cells based on the kind of electrolyte they employ. Each type has both advantages and limitations, which will be investigated and will be presented, through a comparison. The results will be presented and will provide useful data for further research on fuel technology.

Implementation & Means:

- Theoretical analysis of various types of fuel cells
- Comparison of different types of fuel cells, based on the electrolyte they employ
- Advantages, disadvantages, characteristics and limitations of fuel cell types
- Presentation of results

References:

- [1] C. Spiegel, PEM fuel cell modeling and simulation using Matlab. London: Academic, 2008.
- [2] J. Larminie and A. Dicks, Fuel cell systems explained, 2nd ed. ed. Chichester: Wiley, 2003.
- [3] R. P. O'Hayre, Fuel cell fundamentals, 2nd ed. ed. Hoboken, N.J.: John Wiley & Sons, 2009.

Requirements: *theoretical knowledge of fuel cells,*